UNITED STATES PATENT AND TRADEMARK OFFICE

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte CHARLES A. ERIGNAC

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Appeal 2016-003001
Application 13/310,021
Technology Center 2600

_____

Before BRUCE R. WINSOR, LINZY T. McCARTNEY, and
NATHAN A. ENGELS, *Administrative Patent Judges.*

PER CURIAM.

DECISION ON APPEAL

Appellant[1] appeals under 35 U.S.C. § 134(a) from the Examiner's
Final rejection of claims 1 and 4–19. Claims 2, 3, and 20 are canceled. *See*
Response to Non-Final Action 2, 6, 7 (filed Nov. 12, 2014). We have
jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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[1] Appellant identifies the real party in interest as The Boeing Company of
Chicago, Illinois. App. Br. 2.

STATEMENT OF THE CASE

The Invention

Appellant's invention "relates generally to three-dimensional imaging systems and, in particular, to a method and apparatus for simulating images generated by three-dimensional imaging systems in substantially real time." Spec. ¶ 1.

Claims 1, 10, and 19 are independent. Claim 1 is illustrative of the subject matter on appeal:

> 1. A method for simulating images generated by a three-dimensional imaging system, the method comprising:
>
> identifying a group of models for a group of effects produced in the images generated by the three-dimensional imaging system;
>
> identifying an environment model configured to represent an environment in which the three-dimensional imaging system is to be operated;
>
> generating a virtual environment using the environment model in which the virtual environment represents one of an actual environment and a conceptual environment in which the three-dimensional imaging system is to be operated; and
>
> simulating operation of the three dimensional imaging system by generating simulated images that represent a simulation of actual images that could be generated by the three-dimensional imaging system, wherein generating the simulated images includes using the group of models and a three-dimensional rendering system, wherein generating the simulated images further includes using an image buffer along with a point cloud to generate the simulated images that would be generated by the three-dimensional imaging system were the three-dimensional imaging system operating in an environment that is physically substantially equivalent to the virtual environment, and wherein the simulated images further include the group of effects, the group of effects being effects that would be produced

in actual images generated by the three-dimensional imaging system had actual images been taken.

See App. Br. 20 (Claims App'x).

Rejections on Appeal

Claims 1 and 4–19 stand rejected under 35 U.S.C. § 112, second paragraph, as indefinite. *See* Ans. 2–3.

Claims 1 and 4–19 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Robotham et al. (US 6,190,907; issued Dec. 12, 2000) ("Robotham") and Perez et al. (US 2010/0302247 A1; published Dec. 2, 2010) ("Perez"). *See* Ans. 7–33.

ISSUES

The issues for this appeal are:

(1) Does the Examiner err in concluding that the limitations "could be generated," "would be," "were the," and "had the actual images been taken," as recited in claim 1, are indefinite?

(2) Does the Examiner err in finding that the combination of Robotham and Perez teaches or suggests "simulating operation of the three dimensional imaging system by generating simulated images that represent a simulation of actual images that could be generated by the three-dimensional imaging system," as recited in claim 1?

(3) Does the Examiner err in finding that the combination of Robotham and Perez teaches or suggests "identifying a sensor model configured to simulate the three-dimensional imaging system," as recited in claim 4?

(4) Does the Examiner err in finding that the combination of Robotham and Perez teaches or suggests "generating simulated data using

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the group of models for the group of effects, the environment model, the sensor model, and the three-dimensional rendering system, wherein the simulated data includes an image buffer and a depth buffer," as recited in claim 5?

(5) Does the Examiner err in finding that the combination of Robotham and Perez teaches or suggests "generating the simulated images . . . using the image buffer and the depth buffer," as recited in claim 6, and "generating the point cloud using the depth buffer," as recited in claim 7?

ANALYSIS

REJECTION UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

The Examiner finds the phrases "could be generated," "would be," "were the," and "had the actual images been taken," render claims 1, 10, and 19 indefinite because it is unclear whether the limitations following these phrases are part of the claimed invention. *See* Ans. 2–3. The Examiner further finds it is unclear whether a simulation system or the three-dimensional imaging system is performing the simulator operation and whether the simulation system is tangible or intangible. *See id.* at 35–36.

Appellant contends "the cited claim language is fully definite *in the context of the claims.*" App. Br. 8. We are persuaded by Appellant's arguments.

"It is of utmost importance that patents issue with definite claims that clearly and precisely inform persons skilled in the art of the boundaries of protected subject matter." MPEP § 2173. During prosecution "[a] claim is indefinite when it contains words or phrases whose meaning is unclear." *Id.* § 2173.05(e). Language in a claim is unclear if it is "ambiguous, vague,

incoherent, opaque, or otherwise unclear in describing and defining the claimed invention," *In re Packard*, 751 F.3d 1307, 1311 (Fed. Cir. 2014), or if it "is amenable to two or more plausible claim constructions," *Ex Parte Miyazaki*, 89 USPQ2d 1207, 1211 (BPAI 2008) (precedential). A decision on whether a claim is indefinite under 35 U.S.C. 112, second paragraph, requires a determination of whether those skilled in the art would understand what is claimed when the claim is read in light of the Specification. *See Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343 (Fed. Cir. 2010); *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565 (Fed. Cir. 1986).

We agree with Appellant that the terms "could be generated," "would be," "were the," and "had the actual images been taken" do not render claims 1, 10, and 19 indefinite. *See* App. Br. 8–9; Reply Br. 4–5. We agree with Appellant that when the claims are read in light of the Specification, one of ordinary skill would understand that these terms relate the simulated image (generated by the simulator) to a real image, which could be generated by a real three-dimensional imaging system. *See* App. Br. 8–9; Reply Br. 4–5; Spec. Fig. 9, ¶¶ 6, 52, 56, 93. We also agree with Appellant that the claims, when read in light of the Specification, make clear that the simulation system performs the simulation operations. *See* Reply Br. 4–5; claim 1 ("using an image buffer . . . to generate the simulated images"), Fig. 1 (showing image buffer 140 as part of simulation system 100, which is within computer system 110). Lastly, we agree with Appellant that the claims, when read in light of the Specification, also make clear that although the components of the simulation system are tangible, the images produced by the simulation system are intangible. *See* Reply Br. 5; Spec. Figs. 1, 9, ¶¶

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6, 52, 56, 93. Accordingly, we conclude that claims 1, 10, or 19 do not have language that is "ambiguous, vague, incoherent, opaque, or otherwise unclear in describing and defining the claimed invention," *Packard*, 751 F.3d at 1311, or "amenable to two or more plausible claim constructions," *Miyazaki*, 89 USPQ2d at 1211.

For the foregoing reasons, we do not sustain the rejection under 35 U.S.C. § 112, second paragraph, of independent claims 1, 10, and 19, and dependent claims 4–9 and 11–18, which were rejected on the same basis as claims 1, 10, and 19. *See* Ans. 2–3.

REJECTION UNDER 35 U.S.C. § 103(A)

We have reviewed Appellant's arguments and contentions (App. Br. 12–19; Reply Br. 6–16) in light of the Examiner's findings, conclusions, and explanations (Ans. 6–47) regarding the rejection of claims 1 and 4–19 under 35 U.S.C. § 103(a). We agree with the Examiner's findings, conclusions, and explanations and, except as set forth below, we adopt them as our own. The following discussion, findings, and conclusions are for emphasis.

Claim 1

Appellant contends Robotham does not teach or suggest, "simulating operation of the three dimensional imaging system by generating simulated images that represent a simulation of actual images that could be generated by the three-dimensional imaging system," as recited in claim 1. *See* App. Br. 13–16; Reply Br. 7–11. More particularly, Appellant contends Robotham does not teach or suggest simulating the use of a three-dimensional ("3D") imaging system, but rather teaches a production process

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that combines the *actual use* of a 3D imaging system with other media elements to create a virtual stage. *See* App. Br. 13–16; Reply Br. 7–11.

We find Appellant's contentions unpersuasive. As an initial matter, Appellant does not persuasively rebut the Examiner's finding that the analysis step of Robotham's production process can be applied to a synthetic scene rendered from the output of a computer animation or similar system. *See* Ans. at 10 (citing Robotham col. 7, ll. 35–37), 11 (citing Robotham col. 19, ll. 1–12). Contrary to Appellant's contentions, this finding shows that Robotham's production process is not limited to the *actual use* of a 3D imaging system to generate an image, but can alternatively use computer animation or a similar system to render a synthetic image, thereby imitating, or "simulating operation of the [3D] imaging system." *See* Robotham col. 7, ll. 35–37; col. 19, ll. 1–12.

Furthermore, we disagree with Appellant that Robotham's disclosure of analyzing an image stream from an actual 3D imaging system precludes Robotham from teaching or suggesting the "simulating" limitation of claim 1. Claim 1 utilizes the open-ended transition term "comprising." "'Comprising' is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim." *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997) (citation omitted). "The word 'comprising' transitioning from the preamble to the body signals that the entire claim is presumptively open-ended." *Gillette Co. v. Energizer Holdings Inc.*, 405 F.3d 1367, 1371 (Fed. Cir. 2005) (citations omitted). *See also* MPEP § 2111.03. Accordingly, although the broadest reasonable

interpretation of claim 1 requires "simulating operation of the [3D] imaging system," it does not preclude elements in addition to those recited.

Applying this interpretation, we agree with the Examiner that a broad but reasonable interpretation of "simulating operation of the [3D] imaging system" encompasses Robotham's disclosures of deriving abstraction-based object representations of actual physical items and applying choreographic and finishing effects to image-based and abstraction-based data objects to create a 3D virtual stage. *See* Final Act. 10–12 (citing Robotham col. 7, ll. 15–41; col. 8, ll. 48–63; col. 13, ll. 5–18; col. 18, ll. 61–67). These functionalities of Robotham teach or suggest "simulating operation of the [3D] imaging system" (claim 1) by generating, via abstraction, choreography, and/or finishing, images that are distinct from the actual images generated by the actual 3D imaging system, but could have been generated by the actual 3D imaging system. *See* Robotham col. 7, ll. 15–41; col. 8, ll. 48–63; col. 13, ll. 5–18; col. 18, ll. 61–67. Appellant does not persuasively direct us to any evidence that would preclude from the scope of claim 1 systems that include *additional* features, such as Robotham's use of an image stream from an *actual* 3D imaging system in combination with Robotham's abstraction-based, choreographed, and/or finished images. *See* Robotham col. 7, ll. 7–27. Nor do we find evidence of such a preclusion in Appellant's Specification. *See* Spec. Fig. 9, ¶¶ 6, 52, 56, 93.

Appellant has not persuaded us the Examiner erred in the rejection of claim 1 under 35 U.S.C. § 103(a). Accordingly, we sustain the rejection of independent claim 1 under 35 U.S.C. § 103(a), as well as the 35 U.S.C. § 103(a) rejections of independent claims 10 and 19, and dependent claims 8, 9, 17, and 18, which stand or fall together with claim 1. *See* App. Br. 19.

Claim 4

Appellant contends Robotham does not teach or suggest "identifying a sensor model configured to simulate the three-dimensional imaging system," as recited in claim 4. *See* App. Br. 16–17, 21 (Claims App'x); Reply Br. 12. More particularly, Appellant contends that Robotham's scene model is not configured to simulate the 3D imaging system but rather "is asserted to define relationships between and among image-based representations and 3D abstract models of objects within the scene." App. Br. 17. Appellant further contends that "[t]he disclosures of Robotham cited by the Office Action do not simulate the 3D imaging system, but rather merely create a virtual reality." Reply Br. 12.

We find Appellant's arguments unpersuasive. As the Examiner finds, Robotham discloses the use of analysis algorithms or sensors, from which the virtual image stream was taken, to define a scene coordinate system of a spatial reference model. *See* Ans. 14–15 (citing Robotham col. 18, ll. 60–65). Robotham further discloses that the scene coordinate system is then used as the basis for defining image-based objects and abstraction-based data objects as part of Robotham's 3D virtual stage production process. *See* Robotham col. 18, ll. 65–67. Furthermore, as discussed above for claim 1, the derivation and definition of these abstraction-based objects and image-based objects (which are later choreographed and/or finished) for the creation of a 3D virtual stage teaches or suggests "simulating operation of the three dimensional imaging system." *See* discussion *supra*, regarding claim 1. In view of the foregoing, one of ordinary skill would understand that here, consistent with Appellant's Specification, Robotham is using

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analysis algorithms to model how a real sensor would work as a way to define the scene for the purpose of simulating synthetic images or portions thereof. *Compare* Robotham col. 18, ll. 60–67, *with* Spec. ¶ 41 ("In some cases, sensor model 118 may include a number of algorithms and/or processes configured to simulate the operation of three-dimensional imaging system 102."); *see* MPEP § 2112 ("The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection of claims under 35 U.S.C. 102 or 103"); *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418, 421 (2007) (explaining that an obviousness rejection may take into account the knowledge of one of ordinary skill in the art).

Accordingly, Appellant has not persuaded us the Examiner erred in finding that Robotham teaches or suggests "identifying a sensor model configured to simulate the three-dimensional imaging system," as recited in claim 4. Therefore, we sustain the rejection of claim 4 under 35 U.S.C. § 103(a).

Claim 5

Claim 5 recites "generating simulated data using the group of models for the group of effects, the environment model, the sensor model, and the three-dimensional rendering system, wherein the simulated data includes an image buffer and a depth buffer." App. Br. 21 (Claims App'x). Appellant contends Robotham does not teach or suggest these limitations for the following reasons: "[f]irst, Robotham is not generating simulation data[;] [s]econd, Robotham is not using all three of the models and the 3D rendering system[; and] [t]hird, Robotham does not disclose using both an image buffer and a depth buffer." App. Br. 17; *see also* Reply Br. 14.

We find Appellant's contentions unpersuasive, as they amount to a recitation of the claim language, a brief reference to the image rendering process recited in column 21 of Robotham, and an assertion that Robotham does not teach or suggest various limitations of claim 5. *See* App. Br. 17; Reply Br. 14. Merely reciting the language of the claims and asserting that the cited prior art reference does not disclose a claim limitation without further explanation as to a reason for the purported error is insufficient. *See* 37 C.F.R. § 41.37(c)(1)(iv)(2013) ("A statement which merely points out what a claim recites will not be considered an argument for separate patentability of the claim."); *see also In re Lovin*, 652 F.3d 1349, 1356 (Fed. Cir. 2011).

Accordingly, Appellant has not persuaded us the Examiner erred in concluding the combination of Robotham and Perez teaches or suggests the limitations of claim 5. Therefore, we sustain the rejection of claim 5 under 35 U.S.C. § 103(a).

Claims 6 and 7

Appellant contends the combination of Robotham and Perez does not teach or suggest "generating the simulated images that simulate the images generated by the three-dimensional imaging system using the image buffer and the depth buffer," as recited in claim 6, and "generating the point cloud using the depth buffer," as recited in claim 7. *See* App. Br. 18, 21 (Claims App'x); Reply Br. 14–16. More particularly, as per claim 6, Appellant contends that the cited portion of Robotham that disclose rendered objects are blended as required on a pixel by pixel basis, does not disclose the image buffer, the depth buffer, or the generation of a simulated image. *See* App.

Br. 18; Reply Br. 14. As per claim 7, Appellant contends because Perez is still actually using a device, "it is impossible for Perez to disclose generating simulated images which includes generating a point cloud as claimed." App. Br. 18. Appellant further contends "Perez is not generating the point cloud using a depth buffer and an image buffer as claimed, but rather is generating the point cloud using real time sensed data." *Id.*

We find Appellant's contentions unpersuasive. As an initial matter, Appellant's contentions that Robotham and/or Perez do not teach or suggest generating simulated images is unpersuasive for the reasons discussed above for claim 1. *See* discussion *supra*, regarding claim 1. Furthermore, the Examiner finds that Robotham discloses "system using the image buffer and the depth buffer" by extracting information about visual streams of images, and using that information to create scene models for a virtual stage, the scene models including depth mattes and other image information. Ans. 46 (citing Robotham, col. 12, ll. 7–37). Given this disclosure of Robotham, we conclude that one of ordinary skill in the art would understand that some type of storage or buffer would be used to store depth and image information of a visual stream prior to its extraction for analysis. *See* MPEP § 2112; *KSR*, 550 U.S. at 418, 421. Moreover, the Examiner additionally found, and we agree, that Perez teaches using an image buffer[2] and a depth buffer, and

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[2] That Perez may not explicitly disclose an "image" buffer *per se* is of no import. *Cf. In re Bond*, 910 F.2d 831, 832–33 (Fed. Cir. 1990) (citing *Akzo N.V. v. U.S. Int'l Trade Comm'n*, 808 F.2d 1471, 1479 & n.11 (Fed. Cir. 1986)) (interpretation of references "is not an 'ipsissimis verbis' test"); *Standard Havens Prods., Inc. v. Gencor Indus., Inc.*, 953 F.2d 1360, 1369 (Fed. Cir. 1991) ("[a] reference . . . need not duplicate word for word what is in the claims").

that a depth buffer may be captured and converted into an ordered point cloud. *See* Ans. 13–14 (citing Perez Fig. 8, items 8005 ("Receive raw depth data"), 8010 ("intepret point cloud data from the raw depth data"); ¶ 98 ("A depth buffer may be a buffer that records the depth of each pixel that is rendered. . . . [T]he depth buffer may . . . compare each pixel that is to be rendered with the pixel already in the frame buffer at that position.")), 38 (citing Perez ¶ 97 ("[A] depth buffer may be captured and converted into a ordered point cloud.")). Appellant has not persuasively explained why these findings of Perez do not teach or suggest "using the image buffer and the depth buffer," as recited in claim 6, and "generating the point cloud using the depth buffer," as recited in claim 7. *See* App. Br. 18; Reply Br. 14–16.

Accordingly, Appellant has not persuaded us the Examiner erred in concluding the combination of Robotham and Perez teaches or suggests claims 6 and 7. Therefore, we sustain the rejection of claims 6 and 7 under 35 U.S.C. § 103(a).

Claims 11–16

We also sustain the rejections of claims 11–16 under 35 U.S.C. § 103(a), which stand or fall together with claims 4–7. *See* App. Br. 19.

DECISION

The decision of the Examiner to reject claims 1 and 4–19 under 35 U.S.C. § 112, second paragraph is reversed.

The decision of the Examiner to reject claims 1 and 4–19 under 35 U.S.C. § 103(a) is affirmed.

Since we have affirmed at least one ground of rejection with respect to each claim on appeal, the Examiner's decision is affirmed. *See* 37 C.F.R. § 41.50(a)(1).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv). *See* 37 C.F.R. §§ 41.50(f), 41.52(b).

AFFIRMED